



Unintentional Consequences: the Impact of Study Participation on Infant Motor Skills

Ran An & Klaus Libertus

University of Pittsburgh, Department of Psychology



Background

- Parent-guided motor training seems to encourage early motor development:
 - Training using sticky mittens (Libertus & Needham, 2010) or positioning experiences (Lobo & Galloway, 2012)
- Recent findings cast doubt on these results:
 - Replication failures (Corbetta & Williams, 2016) and a systematic review citing weak evidence (van den Berg & Gredebäck, 2020)
- **Can naturalistic in-home experiences encourage motor skills? Even in the absence of formal "training"**

Method

Participants & Procedure

- All study procedures were completed remotely via video conference
- "Trained" group (23 dyads; 11 females)
 - Completed 7-9 in-home observations from 3-6 months of age
 - "Untrained" group (21 dyads; 11 females)
 - Completed one observation at six-months of age

Measures

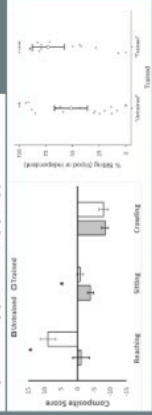
- Measures completed at six months of age
 - Parent-reported Early Motor Questionnaire (EMQ; Libertus & Landa, 2013), Providing Global (GM, FM, PA) & Item-level scores (reach, sit, crawl)
- Direct observation
 - 1-minute independent sitting task
- Measures completed at 10 months of age
 - Communicative Development Inventory (MCDI; Fenson et al., 1994)

Results

MCDI results comparing "Trained" and "Untrained" groups by child age at assessment

Assessment	M	SD	F	p	η ²
Global Motor score	18	23	258	.001	.92
Fine Motor score	18	20	280	.001	.93
Parent Report (EMQ)	18	20	280	.001	.93
Reaching	18	13	812	<.001	.97
Sitting	18	14	542	.001	.91
Crawling	18	24	237	.001	.85
Division of labor (or split)	18	41	104	.001	.71
Fine Motor	18	23	258	.001	.92

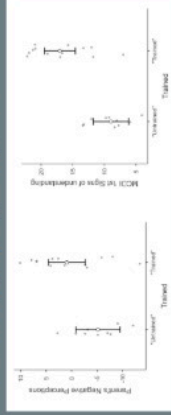
Six months results:
 • "Trained" infants show advanced Fine Motor skills overall and reaching and sitting (see Table).
 Observational measures confirm results.



10 months results:

Differences disappear in the motor domain, but emerge in language development and parental perceptions regarding their child

- "Trained" show more emerging signs of language understanding on the MCDI, $F(1,20) = 19.98, p < .001, \eta^2 = .497$
- Parents of "Trained" infants show fewer negative perceptions about their child, $F(1,19) = 4.39, p = .050, \eta^2 = .188$



Discussion

- Results support the effects of motor training in infancy, arguing against recent findings that contested such effects
- Longitudinal findings provide support for developmental cascades
 - Earlier mastery of sitting skills seems to relate to advanced language development (see Libertus & Voll, 2016)

Limitations

- This study was not prospective and participants were not randomized into their respective groups
- However, no differences between "Trained" and "Untrained" infants on demographic measures
- Parents in the "Untrained" group contacted our lab slightly later to join the research

Conclusion

- Mere participation in brief, naturalistic observations of reaching and sitting for a 6-8 week period encourages the development of early motor skills
 - Total training of less than 16 minutes over the 8-week period
 - Training effects were not intended!
 - Effects were most prominent for the trained skills
 - No evidence for immediate broad generalizations
- Early motor experiences impact subsequent language development
 - The underlying mechanism may work via parent perceptions about the child
- Our findings highlight the high degree of the malleability of early motor development and also cautions future longitudinal studies to examine whether accidental motor training may occur within their study design